SONY

SDK-5000/5200/M SERIES
SDT-5000/5200/M SERIES
DDS TAPE DRIVE

OPERATION/MAINTENANCE
MANUAL

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1.0 INTRODUCTION

Overview

The SDK-5000/5200/M and SDT-5000/5200/M series tape drives are Digital Data Storage (DDS) devices used for high-capacity data storage.

The drive can store up to 8 GB on a single 120m tape when data compression is used, and can read and write DDS and DDS-2 format tapes.

In addition, the built-in SCSI-2 interface allows the drive to be used with a broad range of computer platforms and software.

The unit has an average sustained transfer rate of 732 KB/second with compression enabled, and data reliability is achieved through the Read After Write (RAW) function and three distinct levels of Error Correction Code (ECC).

Features

Major features of the unit include:

- 80,000 hour Mean Time Before Failure (MTBF) at 20% duty cycle
- Support for 60, 90 and 120 meter tape lengths
- 1MB data buffer
- Frame re-write function
- High speed search (200x normal read/write speed)
- Variable or fixed recording block length
- SCSI-2 sequential access command set
- Random read
- N-Group write (optional)
- Dual partition tape (optional)

Models

There are two types of models available:

External versions:
SDK-5000/M – single-ended SCSI with data compression;
SDK-5200/M – single-ended SCSI without data compression.

Internal versions:
SDT-5000/M – single-ended SCSI 3.5" HH with data compression;
SDT-5200/M – single-ended SCSI 5.25" HH without data compression.

Accessories

The following accessories are available:

- **Kit-5S1W-2** (SDT models only)
  5.25" bezel mounting kit, Sony gray
- **Kit-5S1B-2** (SDT models only)
  5.25" bezel mounting kit, black
- **Kit-5ATG-2** (SDT models only)
  Bezel mounting kit, platinum gray
- **DG5CLa**
  Cleaning tape, 120m

For accessory ordering information, contact your local Sony dealer at 1-800-352-7669.

2.0 INSTALLATION

Packing/Unpacking

When initially unpacking the unit, be sure to save the packing materials in case it should become necessary to ship the drive to another destination.

Before shipment, make sure that there is not a tape in the drive before repacking the unit.

Hardware Requirements

SDK-5000/5200/M:

- Power cable (supplied)
- External terminator (supplied)
- 50-pin Centronics male-to-male SCSI connector
- SCSI host adaptor

SDT-5000/5200/M:

- 50-pin SCSI ribbon cable
- SCSI host adaptor or embedded SCSI
- Power supply cable from external computer

Software Requirements

DDS format tape drives are designed to operate with a wide variety of software applications on multiple platforms and operating systems.

For software compatibility information, contact Sony Technical Support at 1-800-326-9551.

Environmental Considerations

The unit should be placed in an area such that it will not be exposed to direct sunlight, high temperature, high humidity or mechanical vibration.

Temperature limits (operating):
41°F to 104°F (5°C to 40°C), 35% RH

Storage temperature range
-40°F to 158°F (-40°C to 70°C)

Altitude range:
Zero to 7,000 feet

Suspended particulate (operating):
Less than 150 microgram/m^3

Vibration (operating):
Swept sine 3 to 500Hz @ 0.25G peak,
1 octave/min., 3 axis, 3 directions

Vibration (non-operating):
Swept sine 3 to 500Hz @ 0.5G peak,
1 octave/min., 3 axis, 3 directions

Shock (operating):
No data loss,
Half sine, 5G peak, 3ms,
3 axis, 2 directions, 10 second interval

Shock (non-operating):
No damage,
Half sine 90G peak, 3ms (30G peak, 11ms),
3 axis, 2 directions, 10 second interval

Dimensions

The dimensions for SDT series units are shown in Figure 2-1.

SDK series dimensions are as follows:

Width: 6.9"
Height: 2.6"
Depth: 9.6"

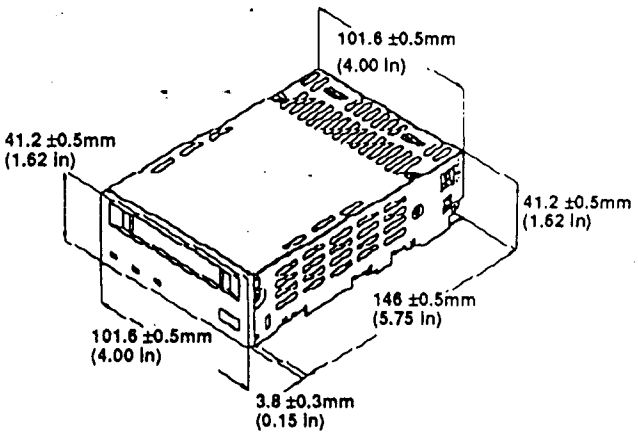

Figure 2-1. SDT Dimensions

Mounting Hole Locations

The mounting holes for SDT series units are shown in Figure 2-2. Four mounting screws, size M3 (metric) are required.

CAUTION: To prevent damage to the drive, mounting screw thread length should not exceed 2.5mm.

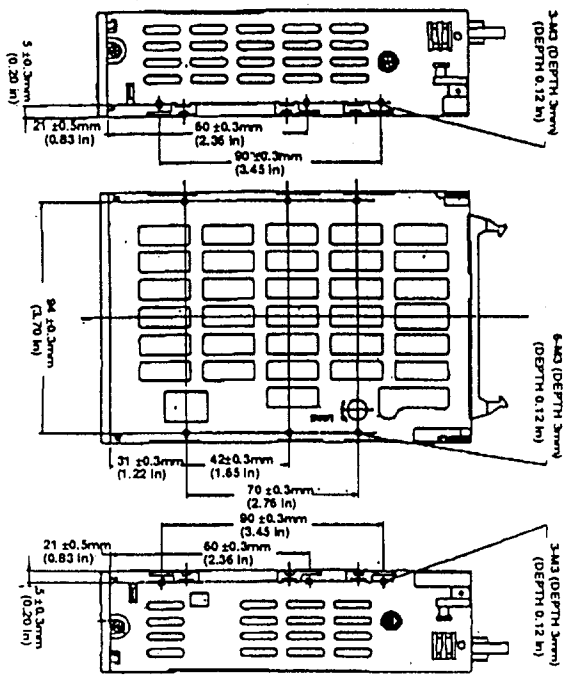

Figure 2-2. SDT Mounting Holes

Orientation

The SDT series can be installed in three different mounting positions, as shown in Figure 2-3. Each position has a maximum tolerance of ±10 degrees.

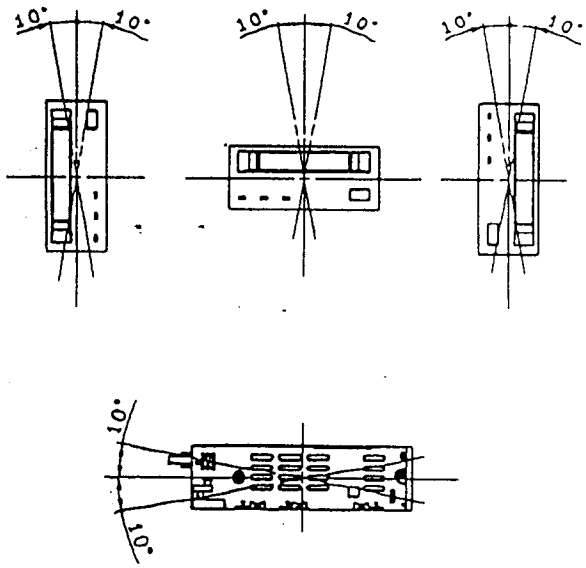

Figure 2-3. Drive Orientation

External Connections

The power, jumper, and SCSI connections for SDK and SDT units are shown in Figures 2-4 and 2-5, respectively.

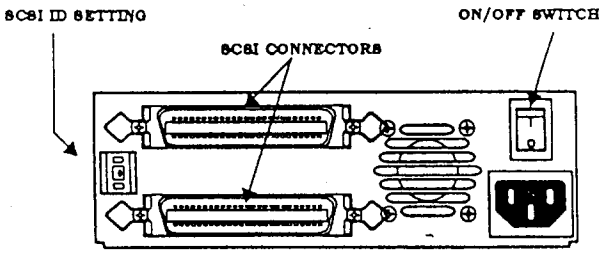

Figure 2-4. SDK External Connections

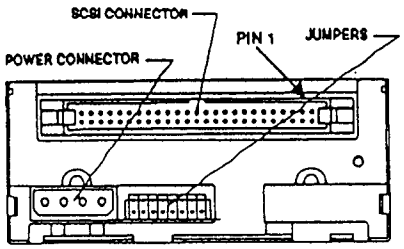

Figure 2-5. SDT External Connections

Power Requirements

NOTE: Never install or remove the power connector when the unit is powered on.

SDK Series

Power specifications for the SDK series are as follows:

40W @ 120VAC
20W @ 220VAC

SDT Series

The power connector for SDT units is shown in Figure 2-6. Power specifications are as follows:

Voltage	Ripple (max)	Current	
		Typical	Max
5V ±5%	100mV p-p	0.8A	1.4A
12V ±5%	100mV p-p	0.2A	0.5A

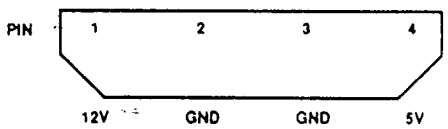

Figure 2-6. SDT Power Connector

Jumper Configuration

The jumper configuration connector for SDT units is shown in Figure 2-7.

NOTE: Never install or remove jumpers when the unit is powered on.

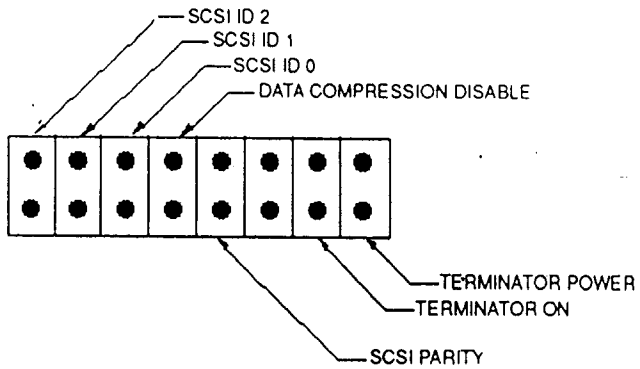

Figure 2-7. Jumper Configuration

Unloading a Tape

A cassette may by unloaded in one of two ways: in response to a SCSI Unload Command, or by pressing the EJECT button located on the front of the unit.

Unload time for a single partition tape is less than 20 seconds after the command is issued or the key is pressed.

Write-protecting a Tape

To write-protect a tape, slide the tab on the back of the cassette to the open position. In this way, data can be read but not written to the tape.

Using the Cleaning Tape

Although the unit has a built-in head cleaner designed to last the life of the drive, a cleaning tape should be used periodically to clean the tape path.

Minimum recommended cleaning is at the LED request, which is displayed after every 24 hours of drum rotation (refer to page 3-3).

Emergency Tape Removal

CAUTION: This procedure must be performed only by mechanically qualified personnel to avoid damage to the tape. Do not proceed if it appears the tape or drive will be damaged.

1. Refer to Figure 3-1. Remove the drive from the chassis or enclosure to allow access to the bottom and left side of the drive.
2. Remove the top cover to the drive.
3. Rotate the motor shaft by turning the UNLOAD/LOAD adjustment on the bottom of the drive clockwise until the threading mechanism is in its initial position.
4. Press the ratchet mechanism on the left side of the drive until all tape slack is completely removed.
5. Continue to rotate the motor shaft clockwise until the tape lifts out of the drive mechanism and ejects.

   NOTE: If you feel a click in the turning mechanism, stop turning. This means you have reached the end of the mechanism's unload path. Turn in the opposite direction until the clicking stops.
6. Take the drive to your Sony Regional Service Center for repair, or call Sony Service at (408) 922-0699.

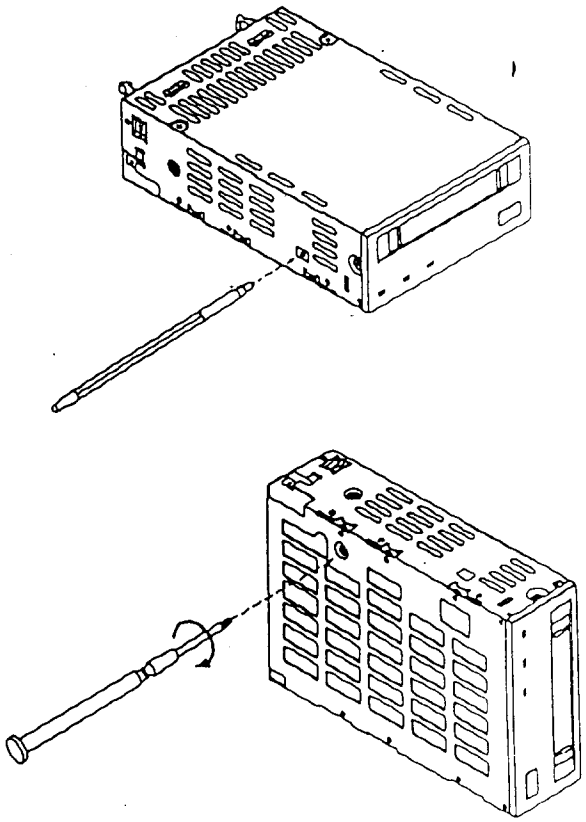

Figure 3-1. Emergency Tape Removal

SCSI Messages and Commands

The following SCSI messages and commands are supported:

SCSI Messages:

Abort
Bus Drive Reset
Command Complete
Disconnect
Extended Message
Identify (with and without Disconnect)
Initiator Detected Error
Linked Command Complete
Linked Command Complete (with Flag)
Message Parity Error
Message Reject
No Operation
Restore Pointers
Save Data Pointer
Synchronous Data Transfer Request

SCSI Commands:

Erase
Extended Diagnostic
Inquiry
Load/Unload
Locate
Log Select
Log Sense
Mode Select (6)
Mode Sense (6)
Prevent Allow Medium Removal
Read
Read Block Limits
Read Buffer
Read Log
Read Position
Receive Diagnostic Results
Recover Buffered Data
Release Unit
Request Sense
Reserve Unit
Rewind
Seek Block
Send Diagnostic
Space
Test Unit Ready
Verify
Write
Write Buffer
Write Filemarks

Read After Write Error Correction

For Read After Write (RAW) error correction, each frame can be rewritten up to 127 times.

With N-Group writing, where every group is written a fixed number of times, the upper limit is 8.

APPENDIX A SPECIFICATIONS

Specifications

All specifications are typical at 25°C and subject to change without notice.

Power requirements:

5VDC, 12VDC ±5%	(SDT-5000/M)
5VDC, 12VDC ±5%	(SDT-5200/M)
120/220VAC	(SDK-5000/M)
120/220VAC	(SDK-52000/M)

Power consumption:

6.5 W	(SDT-5000/5200/M)
40/20W	(SDK-5000/5200/M)

Linear recording density:
61,000 BPI

Access time:
35 sec (max.)

Drum rotation speed:
4,000 RPM

Uncorrectable error rate:
Less than 10^{-15} bits

High burst transfer rate:
3MB/sec asynchronous
5MB/sec synchronous

Ambient noise (A = curved weight):
No greater than 25dB (A)

Streaming read/write noise:
35dB (A)

Inset/eject noise:
60dB (A)

Electromagnetic interference (EMI):
Radiated, conducted:
FTZ/FCC class B,
VCCI-2 equivalent

ESD discharge voltage:
Less than 15kV, no operation failure
Less than 20kV, no drive damage

APPENDIX B TROUBLESHOOTING

CANNOT INSERT TAPE INTO DRIVE

- Ensure there is not a tape already in the drive by pressing the EJECT button.

  If the power was turned off with a tape in the drive, the tape will rewind to the beginning when the power is turned back on.

- Power the unit off. Wait five seconds, then power the unit on. Observe the drive for normal power-up sequence. If the LEDs do not illuminate properly, check the power supply and the power cable connection.

CANNOT EJECT TAPE FROM DRIVE

- If the PREVENT ALLOW MEDIA REMOVAL SCSI command has been sent to the drive with the prevent bit set to one, the tape will remain in the drive even after an UNLOAD command, and the EJECT key will be disabled.

  To override this condition the host computer can either: send a PREVENT ALLOW MEDIA REMOVAL command with the prevent bit clear, or issue a SCSI bus reset command; or you can turn the power to the drive off and then back on.

  If you have changed the bezel of the drive, verify that it has been installed correctly.

  If the tape will still not eject, the drive must be returned to Sony for service.

NO RESPONSE TO SCSI COMMANDS

If the drive powers up and loads/unloads tapes properly but will not respond to SCSI commands, check for the following.

- If a SCSI bus reset does not cause the drive to power-on reset:
  - ensure all of the cables and connectors are properly seated and undamaged;
  - ensure pin 1 of the SCSI cable is aligned with pin 1 of the SCSI connector.

- If a SCSI bus reset causes the drive to power-on reset, then the problem is with the SCSI bus addressing or termination. Proceed as follows:
  - ensure that the SCSI ID jumpers are properly configured (refer to page 2-9);
  - ensure that the SCSI devices at each end of the SCSI cable are terminated, and that no terminator plugs are installed on any other SCSI devices (refer to page 2-12).

Sony Technical Support

Technical assistance is available toll free, by calling 1-800-326-9551.